SATURDAY MECHANIC

BY BOB FREUDENBERG

Curing Steering Wander

YOU'RE almost enjoying a long drive on a nice, flat interstate. Almost, because it's windy and you need to saw the steering wheel back and forth, tacking like a sailboat, to stay in your lane. That is, until you make a short rest stop and realize that there's no wind whatsoever. The kids in the back seat are screaming for Dramamine, and you're fatigued after only an hour of driving.

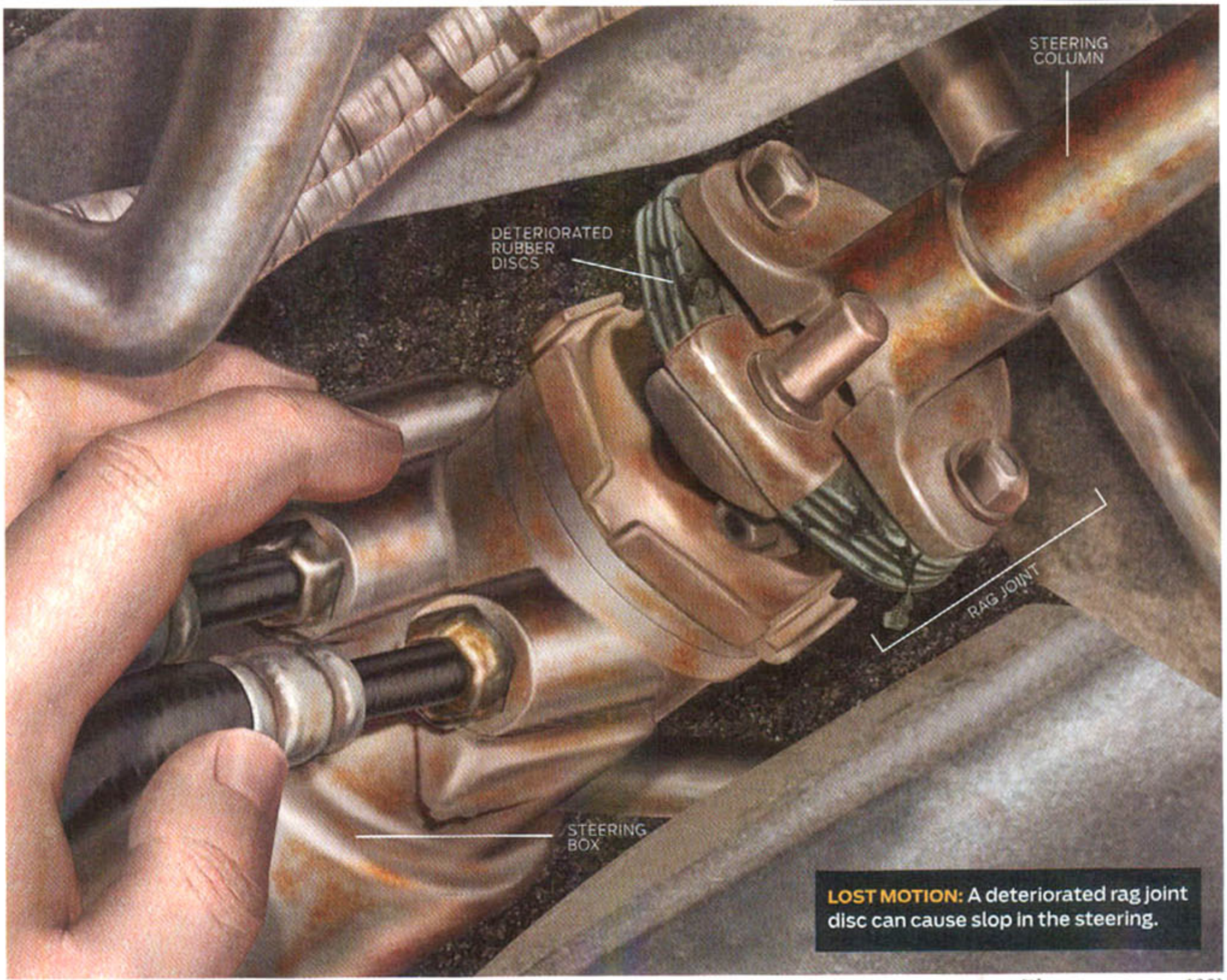
There's no doubt about it—you definitely have some steering issues.

VEHICLE-TO-PAVEMENT INTERFACE

Before you start thinking about expensive repairs, make sure the basic vehicle-to-road interface is okay, meaning the tires. First, check inflation pressures. (Don't trust the gauge on the quarter-eating pump at the local station—those are often off by as much as 5 pounds. Drop 10 bucks on a good gauge and keep it in your glovebox.) You should check your tire pressures once a month. And that's first thing in the morning, cold. The correct pressure is on a sticker—check your owner's manual for its exact location. A low tire on one side will make a car pull in that direction. This is because its rolling diameter will be smaller than that of its mate on the other side. Also, there'll be more tread-to-pavement drag on the low side, pulling the car in that direction.

DEGREE OF DIFFICULTY

DIFFICULT



LOST MOTION: A deteriorated rag joint disc can cause slop in the steering.

ILLUSTRATIONS BY LEONELLO CALVETTI

(Please turn to page 128)

PSSST!: Low tire pressure will cause a wheel to pull.

If the problem persists, try switching the positions of the right and left tire/wheel assemblies. If the car pulls in the opposite direction after you've done this, you've found tire trouble.

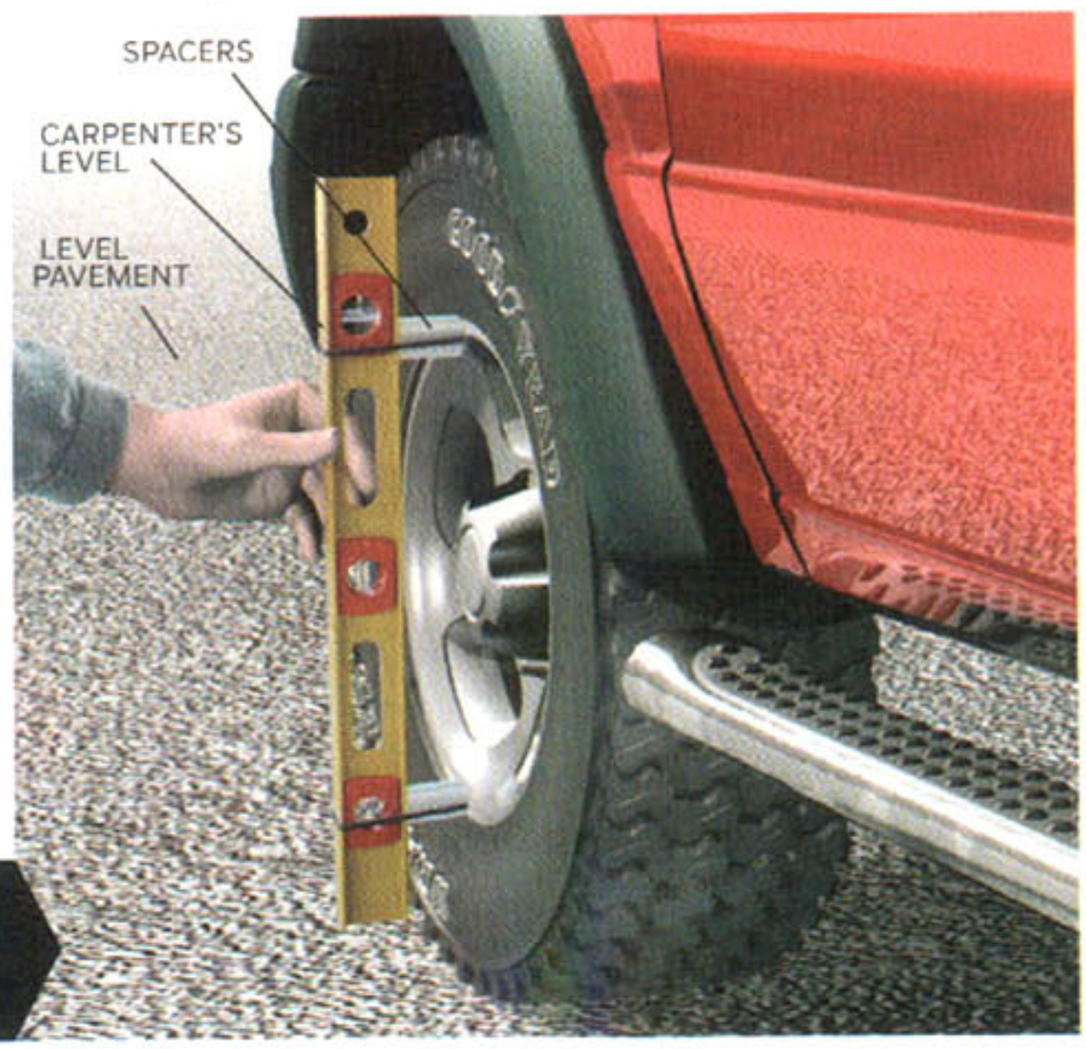
Check your tires' tread-wear patterns. For example, if a front tire's tread tends to disappear along the outboard edge, it's likely that the camber setting at that corner is too positive, and any pull probably will be toward that side.

GEOMETRICAL CONSIDERATIONS

Camber refers to the tilt of the tire from the vertical, and this has a profound effect on directional tendencies. Zero camber means the centerline of the tire is perfectly perpendicular to a level surface. If the top of the tire tilts outward from the body, camber is said to be positive. Going too far in this direction will cause a pull to that side because the tire itself forms the shape of a cone.

Don't run to the alignment shop just yet. You can get a pretty good idea of camber by using a carpenter's level, although you'll need to be parked on a perfectly level space. We used two 35mm film canisters held to the edge of the level with rubber bands. The canisters served as feet that we placed at the top and bottom of the wheel's rim. Keep in mind that most vehicles will have a degree or two of negative camber.

Here's where ride height comes in. As springs or torsion bars sag with age, camber changes. Replacing coil springs or adjusting torsion bars can bring alignment back into specs.



THIS SIDE UP: A quick camber check can be done with a level and two simple spacers.

WOOF!

Even if the front wheels are perfectly aligned and tires properly inflated, you may still have to steer constantly in one direction or the other to keep the vehicle going straight up the road. The problem is that the rear wheels are also trying to steer the vehicle and overtake the fronts. This condition is commonly referred to as dog tracking.

Technically this occurs when your vehicle's "thrust line" and centerline are too far apart. On vehicles with solid rear axles, the thrust line is perpendicular to the rear axle. On vehicles with an independent rear suspension (IRS), the thrust line is determined by splitting the toe-in angle of the rear wheels. For example, if the left rear wheel is toed in at 4° and the right is toed at zero, the thrust line is 2° to the left of the centerline.

In an ideal world the two lines coincide. But given a vehicle's size, manufacturing tolerances, wear and abuse of daily driving, they often do not. If the deviation between the two is great, your vehicle will dog track. Besides having a steering wheel that's not at center when you're going straight, another obvious clue to dog tracking is if you see four distinct tracks in the snow or rain when driving straight.

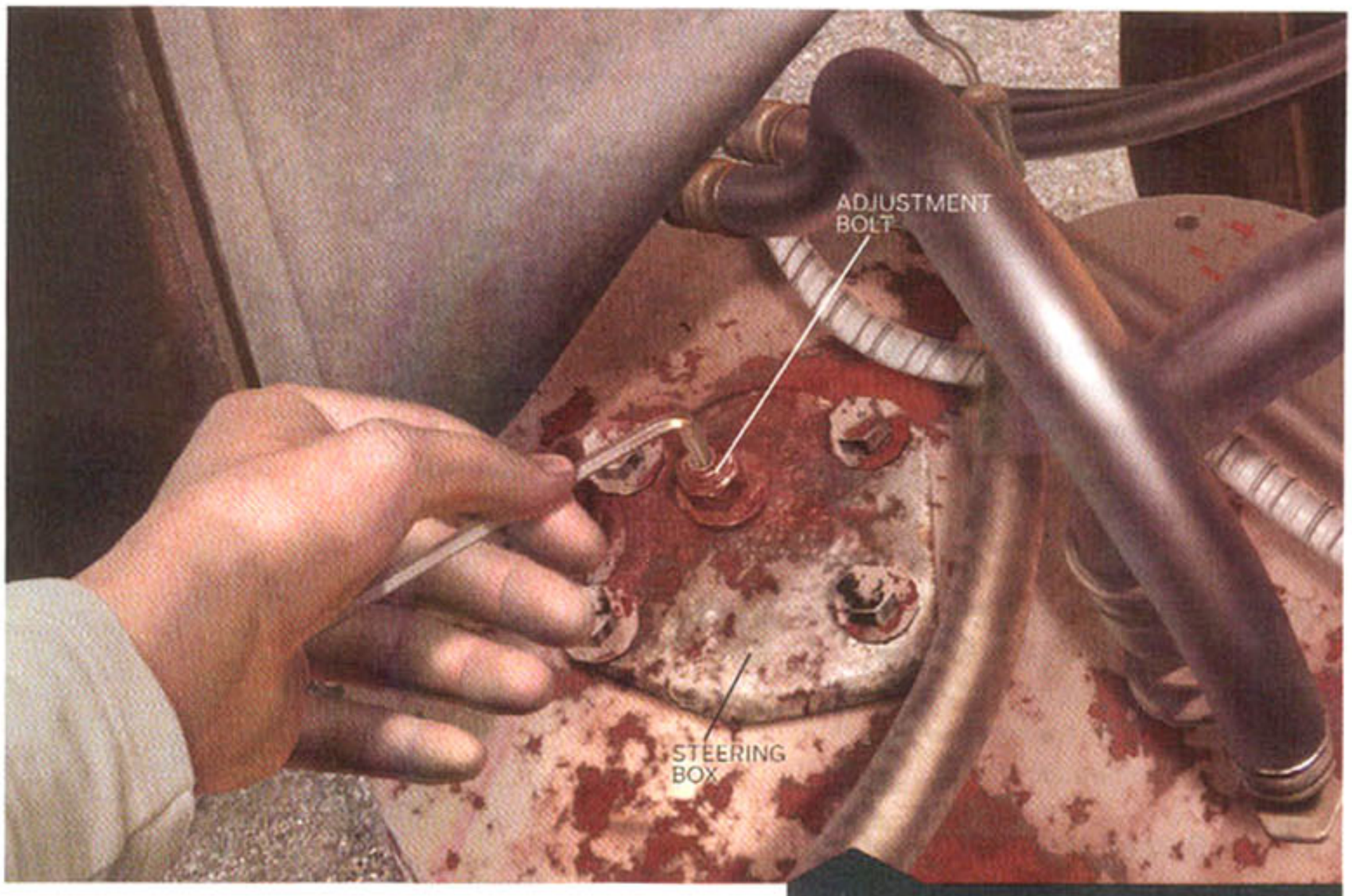
This is just about impossible to correct without professional 4-wheel-alignment equipment. On IRS cars, tapered shims are typically installed under the rear stub axles to reconcile the thrust line and centerline and to restore harmony. With solid rear axles, the repair will require replacing the rear links or straightening the frame.

(Please turn to page 130)

WANDERLUST

If your car doesn't have a definite pull to one side, but instead a sloppy, undisciplined tendency to wander all over the place, the first thing to think about is wear in the steering and suspension.

Direct observation is the best way to find this, but you'll need a helper. With the car sitting with all wheels solidly on the pavement, have him or her unlock the steering column, then rock the wheel vigorously back and forth while you stick your head underneath and inspect with a light. (Needless to say, do this with the engine off.)



LOOSE: Minor adjustment to the clearance of a high-mileage steering box can tighten up the steering.

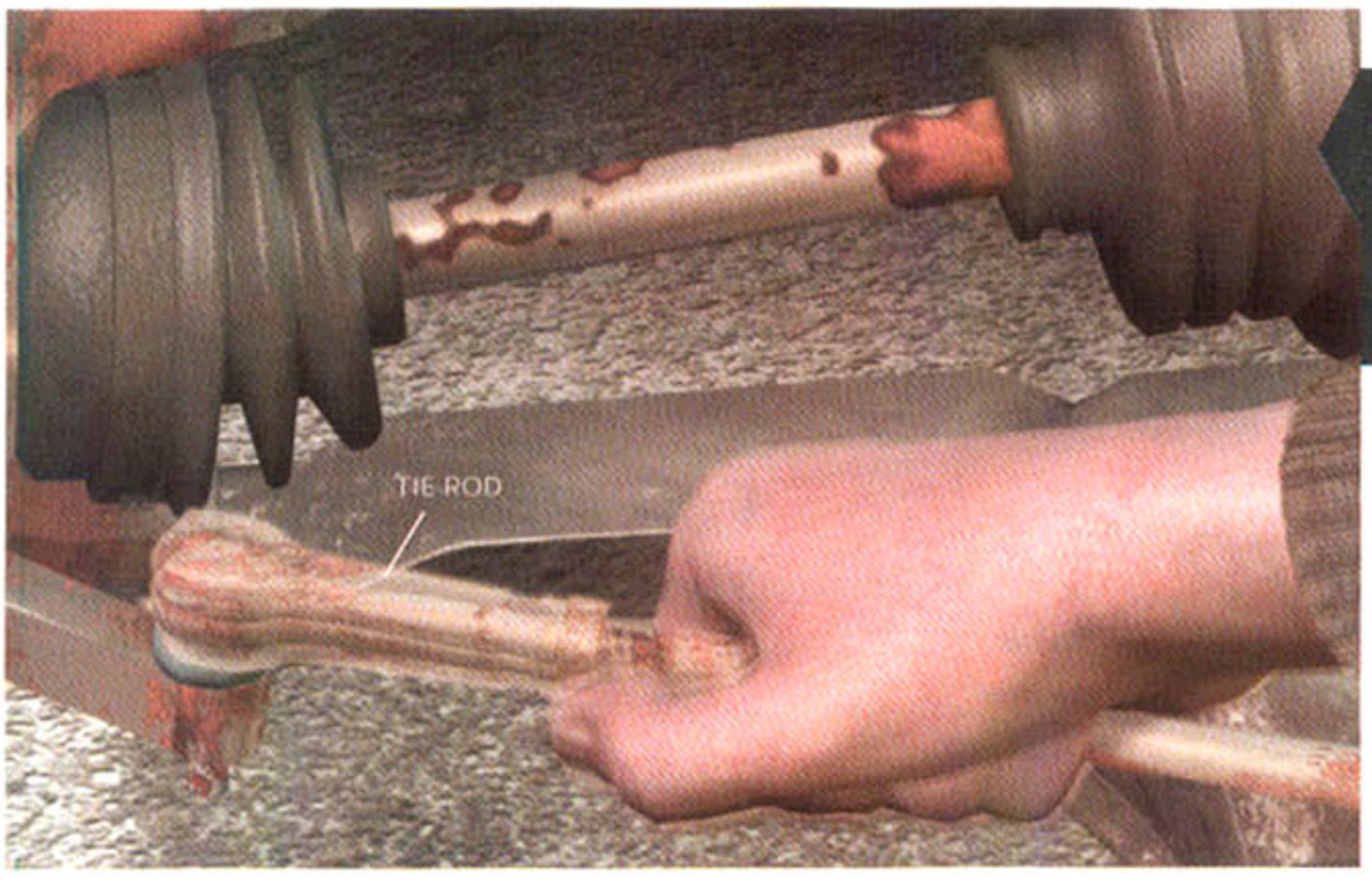
With a parallelogram steering system—the kind with a Pitman arm coming out of the steering box—you may see the idler or Pitman arm moving up and down. Or you may notice slop in the tie-rod ends or perhaps more rotational action going into the steering box than coming out. With rack-and-pinion steering, pay special attention to the inner tie-rod ends, and make sure the rack housing itself is firmly mounted.

Another way to inspect is to slightly raise one tire off the ground (place the jack under the lower control arm, then have your assistant rock that tire side to side, then top to bottom, while you take a look).

STEERING BAG?

With the recirculating-ball steering boxes typically found on big domestic rwd cars, pickups and SUVs, lash will gradually develop between the worm and sector gears. You can eliminate this problem by doing an "over-center adjustment." You'll find an adjusting bolt or screw sticking out of the top of the steering box. With the wheels as close to the straight-ahead position as you can get them, loosen the lock-nut, then turn the screw clockwise to reduce lash. Do not overdo this or you can reduce interior tolerances too much, causing damage. You'll know you've gone too far if the steering wheel stays where you put it instead of returning to a straight-ahead position under normal road forces, especially when coming out of a turn.

Lash may exist in the joints that allow the steering column to transmit the helmsman's commands to the gearbox. The universal variety typically lasts forever, but the rubberized textile type, fondly known as a "rag joint," often deteriorates to the point at which there's excessive play.



LOOSER: Worn tie-rod ends let the wheels wander, making steering vague.

Deteriorated upper control arm bushings can cause serious steering problems, and probably a lot of clunking to boot. Look down on them while your helper holds the brakes and shifts from Drive to Reverse and back. You'll see and hear excessive movement. **PM**

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